

# NASA TECH BRIEF



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## Distant Objects Detected Visually with Optical Filters

**The problem:** To detect and identify distant objects by visual means during daylight. The usual devices of visually distinguishing relative motion, color or shading differences, or flashing lights or beacons are relatively ineffective when a distant object must be located in bright sunlight.

**The solution:** The object is coated with a fluorescent paint. The general area in which it is located is scanned alternately through a transmitting filter and an obscuring filter. This technique causes the object to appear as a blinking point of light against a steady background.

**How it's done:** The optical filtering technique takes advantage of the selective bandwidth transmission and reflection characteristics available in optical filters. The transmitting filter admits both the background light and the fluorescent glow from the sought object while the obscuring filter admits only the background light. When the object is alternately seen through the transmitting filter and obscured by the obscuring filter, it appears to blink against a steady background. Studies have been made of the human eye's ability to detect a colored point-source target against a celestial-body background using combinations of transmitting and obscuring filters as visual aids. Test results were best when the object was given a fluorescent blue-green coating and the visual search

was made using a matched set of yellow and pale blue, or magenta and medium green filters.

### Notes:

1. This technique enables detection of objects as dim as fourth and fifth magnitude compared to the 1.8 magnitude limitation experienced with other visual detection methods.
2. This detection method should have application in search and rescue operations.
3. Further information concerning this invention is presented in NASA TN D-2531, "A Technique for Visual Detection of Distant Objects in Space by Use of Optical Filtering" by Kenneth R. Garren, December 1964, available from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia, 22151; price \$0.50. Inquiries may also be directed to:

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**Patent status:** NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

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